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## Effect of tree density and different fertilizer levels on growth of cashew (*Anacardium occidentale* L.) under coastal sandy soils of Andhra Pradesh

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### Abstract

An experiment was conducted during the year 2001-2014 at Cashew Research Station, Bapatla situated in southern coastal region of Andhra Pradesh. The experiment comprising of nine treatments with a objective, to study the response of vegetatively propagated material of cashew to different doses of NPK fertilizers at different spacing's with a variety BPP-8, developed at All India Coordinated Research Project on Cashew, Bapatla, Andhra Pradesh.

The result of the study revealed that among the treatments, the treatment S3M1 (spacing 5m x 4m and fertilizer levels 75kgN, 25kg P2O5, 25kg K2O) has recorded the maximum mean plant height (4.74 m) followed by the treatment S1M1 (spacing 10x5m and fertilizer level 75kgN, 25kg P2O5 & 25kg K2O) of 4.45m. The lowest mean plant height was recorded in the treatment S2M3 (spacing 6m x 4m and fertilizer level 225kgN, 75kg P2O5 & 75kg K2O) of 3.72m. Maximum mean trunk girth was recorded in the treatment S3M1 (73.78)cm followed by the treatment S1M2 (spacing 10x5m and fertilizer level 150kgN, 50kg P2O5 & 50kg K2O) of 72.09cm. The lowest mean trunk girth was recorded in the treatment S2M3 (52.87cm). Maximum mean canopy height was recorded in the treatment S1M1 (4.28m) followed by the treatment S3M1 (4.19m). Minimum canopy height was recorded in S1M3 (spacing 10x5m and fertilizer level 225kgN, 75kg P2O5 & 75kg K2O) of 3.46m and which was on par with S2M2 (3.46). The maximum mean canopy diameter was found highest with the treatment S1M1 (6.51m) and followed by the treatment S1M2 (10x5m spacing and 150kgN, 50kg P2O5 and 50kg K2O) of 5.95m. Minimum canopy diameter was recorded in S3M3 (spacing 5x4m and fertilizer level 225kgN, 75kg P2O5 & 75kg K2O) of 4.60m. The maximum mean canopy surface Area was registered with S1M1 (57.29 m<sup>2</sup>) followed by S1M2 (spacing 10x5m and 150kgN, 50kg P2O5, on 50kg K2O) of 50.07 m<sup>2</sup> and minimum was recorded with the treatment S2M3 (spacing 6x4m and fertilizer level 225kgN, 75kg P2O5 & 75kg K2O) of 32.15m<sup>2</sup>.

The mean percentage of ground area covered by canopy was found highest in S3M1 (spacing 5x4m and fertilizer level 75kgN, 25kg P2O5 & 25kg K2O) of 218.80 and followed by S2M2 (spacing 6x4m and fertilizer level 150kg N, 50kg P2O5 & 50kg K2O) of 202.52. The lowest percent of ground area covered by canopy was observed in the treatment S1M3 (spacing 10x5m and fertilizer level 225kgN, 75kg P2O5 & 75kg K2O).

**Keywords:** Fertilizer, *Anacardium occidentale* L. coastal sandy

### Introduction

Cashew (*Anacardium occidentale* L.) a member of the family Anacardiaceae with natural order Sapindales, is an evergreen tree. It is a native of tropical central and South America (Paul, 1936)<sup>[3]</sup>; but is now distributed all over the tropics and part of warm subtropics (Conrad, 1994). However, colder subtropical areas are not suitable for cashew due to cold and frost; although the tree may grow and even bear a few flowers. However, very little efforts have been made to collect historical evidence of the cashew cultivation except the first illustrative description of cashew was given by French naturalist, Thevet in 1558 AD. The country of origin is north Brazil from where it has been thoroughly dispersed throughout the tropical low land of Mexico and West Indies. It was introduced into Africa and India by Portuguese travellers in the 15<sup>th</sup> and 16<sup>th</sup> centuries (De Costa, 1578). Cashew is one of the important plantation crop cultivated in an area of 9.82 lakh hectares with an annual nut production of 7.28 lakh tons with an average productivity of 772kg/ha in India and in Andhra Pradesh it is cultivated in an area of 1.83 lakh hectares with an annual production of 1.18 lakh tons with an average productivity of 646kg/ha (DCCD, 2013). An experiment was conducted to study the performance vegetatively propagated material of cashew to different doses of NPK fertilizers at different spacings with a variety BPP-8 All India coordinated Research project centre of

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Andhra Pradesh. The low productivity and low yield potential of different existing varieties that are developed in the state accordingly the improvement of the crop through crop management through clones and their evaluation has been taken up since 2001 at Cashew Research Station, Bapatla, Guntur District, Andhra Pradesh with this objective performance of vegetatively propagated material of cashew to different doses of NPK fertilizers at different spacings under coastal sandy soils of Andhra Pradesh is evaluated for the last fourteen years. The observations on different growth parameters, yield parameters and nut characters were recorded and discussed in the present study. Performance of tree density and different fertilizers levels on growth of cashew (*Anacardium Occidentale* L.) under coastal sandy soils of Andhra Pradesh.

An experiment was conducted to study the performance of effect of tree density and different fertilizer levels on growth of the cashew in coastal sandy soils of Andhra Pradesh under All India Coordinate Research Project on Cashew, Cashew Research Station, Bapatla. The low productivity and low yield potential with normal spacing's and normal dosage of fertilizers existing in cashew, hence an experiment with different level if spacing's and different levels of NPK fertilizers doses were taken up since 2001 at Cashew Research Station, Bapatla, Guntur District, Andhra Pradesh, with this objective 9 treatments were evaluated for 13 years. The observations on different growth parameters were recorded and discussed in the present study. Effect of tree density and different fertilizer levels on growth of the cashew (*Anacardium Occidentale* L.) in coastal sandy soils of Andhra Pradesh.

### Material and Methods

A field experiment was conducted for 13 years at Cashew Research Station Bapatla Guntur District Andhra Pradesh of Dr. YSR Horticultural University Andhra Pradesh from 2001-2014. The experimental plot located in a typical sandy soil conditions which is eight kilometer away from the sea coast and lies between 15°54'943 North latitude and 80°29'029 East longitude. The experiment was laid out in split plot design with four replications for each treatment. The experiment comprising of nine treatments includes three levels of spacing S1 (10x5m), S2 (6x4m) & S3 (5x4m) and fertilizer level M1 (25kg N, 25kg P<sub>2</sub>O<sub>5</sub>, 25kg K<sub>2</sub>O), M2 (150kg N, 50kg P<sub>2</sub>O<sub>5</sub>, 50kg K<sub>2</sub>O) and M3 (225kg N, 75kg P<sub>2</sub>O<sub>5</sub> 75kg K<sub>2</sub>O) as treatments replicated each treatment in four rows with each row comprising ten plants. The clonal plants were planted in the year 2001 and were maintained in each treatmental plot at Cashew Research Station, Bapatla. The observation recorded were like plant height (m), trunk girth (cm), canopy height (m), canopy diameter (m), canopy surface Area (m<sup>2</sup>) and % of ground area covered by canopy. The experimental data were subjected to statistical analysis and procedure laid out by Panse and Sukat me (1985) [2].

### Results and Discussion

The performance of cashew clones planted at different spacing's with different levels of fertilizers for their growth parameters were presented in the table. The data showed significant differences among the different treatments for their growth parameters. The result of the investigation have shown that the treatment S3M1 has recorded the highest mean plant height (4-74m) followed by S1M1 (4.55m). The lowest mean plant height was recorded with the treatment S2M3

(3.72m). The mean trunk girth was found maximum in the treatment S3M1 (73.78cm) followed by S1M2 (72.09cm) and the lowest was registered with S2M3 (52.87cm). The mean canopy height was registered highest with S1M1 (4.28m) followed by S3M1 (4.19m). The lowest mean canopy height was found with S2M2 (3.46m) and was on par with S1M3 (3.46m). The mean canopy diameter was recorded the maximum in the treatment S1M1 (6.51m) followed by S1M2 (5.95m) and the lowest was registered with S3M3 (4.10m). The highest mean canopy surface area was registered with the treatment S1M1 (57.29m<sup>2</sup>) and followed by S1M2 (50.07m<sup>2</sup>) and the lowest was recorded with the treatment S2M3 (32.15m<sup>2</sup>). The mean percentage of ground area covered by canopy was highest with S3M1 (218.80.1) followed by the treatment S2M2 (202.52).

### Conclusion

In the present investigation under present agro climatic conditions of Bapatla, the treatment S3M1 has recorded the maximum plant height (4.74m), maximum mean trunk girth (73.78cm) and mean canopy height was found highest in the treatment S1M1 (4.28m) and which was found superior among the other treatments. Similarly the mean canopy diameter was found highest in the treatment S1M1 (6.51m) and was found superior among the other treatment. The mean canopy surface area was registered highest with the treatment S1M1 (57.29m<sup>2</sup>). The mean percentage of ground area covered by canopy was recorded the highest with S3M1 (218.80) and was found significantly superior to the other treatments. Hence it is concluded that the treatment S3M1 has recorded the maximum plant height and trunk girth. Whereas maximum canopy diameter and canopy surface area were resulted in the treatment S1M1, which influence the flowering and yield parameters.

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